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GEOLOGICAL INVESTIGATION OF THE BOEUF - TENSAS BASIN LOWER MISSISSIPPI VALLEY

by

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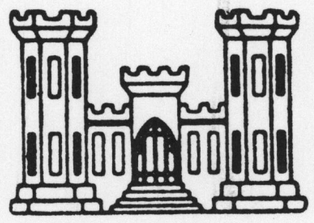

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The Boeuf-Tensas Basin

1. The combined Boeuf and Tensas Basins occupy that portion of the Lower Mississippi Valley lying west of the Mississippi River between approximately Greenville, Mississippi, on the north and the mouth of the Red River on the south (fig. 1). The two basins are separated along a north-south line by Macon Ridge, a low ridge of alluvial origin which extends from Eudora, Arkansas, south to Sicily Island, Louisiana. Including all or parts of two counties in Arkansas and twelve parishes in Louisiana, the basins have a north-south extent of about 160 miles and an average east-west extent of about 40 miles.

2. Drainage in the Boeuf Basin (west of Macon Ridge) is to the south primarily by way of the Boeuf River and Bayou Bartholomew, which, in turn, discharge into the Ouachita, Black, and Red Rivers. Tensas Basin drainage (east of Macon Ridge), is also to the south, primarily by way of Bayou Macon and the Tensas River, which, in turn, discharge into the Black and Red Rivers. Throughout this entire area, no basin streams become tributary to the Mississippi River.

3. Also included within the scope of this report is a narrow strip of Mississippi River floodplain (averaging about 5 miles wide) lying east of the Mississippi River and extending from Vicksburg to south of Natchez, Mississippi. Although not technically part of either basin, the area is included herein because it is neither a physiographic division itself nor a part of any other physiographic division.

Purpose and Scope

4. During the past decade, the Waterways Experiment Station (WES) has initiated investigations of the Yazoo Basin (1958) and the St. Francis Basin (1964) portions of the Lower Mississippi Valley. The purposes of these investigations have been (a) reconstruction of the geologic history of the area, (b) determination of the areal distribution and physical characteristics of the various alluvial deposits, (c) analysis of subsurface conditions of various environments of deposition as an aid in determining foundation and underseepage conditions, and (d) determination of the nature of and the depth to the Tertiary deposits lying beneath the Recent alluvium. The present report on the Boeuf-Tensas Basin has the same goals. It is presented in the format of the previous reports, i.e. a loose-leaf folder to which periodic supplements can be added.

5. It is anticipated that several years will be required to complete the investigation of the Boeuf-Tensas Basin. The basic mapping will be accomplished on standard 1:62,500-scale topographic quadrangles supplemented by geologic cross sections. As the map supplements are prepared, the tabulations of the physical properties of the soils and the basic descriptions of deposits and environments will be amended and/or revised to reflect the additional data.

Mapping Procedure

6. The areal distribution of the Recent environments of deposition in the Boeuf-Tensas Basin is being determined largely from aerial photos and photo mosaics ranging in scale from 1:10,000 to 1:62,500 and in date from 1933-35 to 1962-65. Pertinent geologic publications such as groundwater investigations and state geological survey bulletins provide much of the data on the Pleistocene and Tertiary formations exposed in the uplands and beneath the Recent alluvial deposits.

7. During the mapping activities, periodic searches are made to locate logs of as many borings and wells in the area as possible. Agencies such as the U. S. Army Engineer District, Vicksburg, the U. S. Geological Survey (Ground Water Branch offices), and the Louisiana, Arkansas, and Mississippi State Highway Departments, as well as private well drilling firms, private foundation engineering firms, and oil companies, have furnished subsurface data for use in the study. The more detailed subsurface information, usually the logs of holes drilled by the Corps of Engineers, are used to construct cross sections through the various quadrangle areas and to contour the surface of the entrenched Tertiary formations.

Geologic Setting

8. Deposits of Tertiary age are exposed at the surface in the Boeuf-Tensas Basin area at widely scattered localities along the eastern valley wall and along the western valley wall in the vicinity of Sicily Island. Elsewhere in the upland areas, terrace deposits of Pleistocene age and/or loess completely blanket the Tertiary deposits. The oldest exposed Tertiary formations, located near Vicksburg, Mississippi, are included in the Vicksburg Group (Oligocene Series, fig. 2). From this area southward, progressively younger formations are exposed; the Pascagoula formation (Miocene Series) crops out south of Natchez, Mississippi, to the southern limits of the area.

9. Throughout the entire basin area, Tertiary deposits underlie the Recent alluvium at depths varying from a few feet to as much as 350 ft. The appreciable differences in depth are a result of cyclic entrenchments by the ancestral Mississippi River and various tributaries during Pleistocene times when these streams were scouring vertically as well as horizontally in an effort to adjust their gradients to lower-than-present sea levels. The lower sea levels were brought about by the large volumes of water that were trapped in continental glaciers.

10. The last entrenchment of the Tertiary surface is evidenced by a dendritic pattern of separate trenches, the deepest and widest of which was the course of the combined Mississippi and Ohio Rivers. This particular trench trends south-southwestward from a point near Tallulah, Louisiana, to near Sicily Island, turns westward to a point near the junction of the Tensas and Ouachita Rivers, thence trends southward roughly along the course of the Black River (fig. 1). Separate trenches conducting the flow of the ancestral Ouachita and Arkansas Rivers become tributary to this trench in the basin area.

11. The Tertiary deposits comprising the entrenched valley floor range in age from Eocene (Claiborne Group) to Miocene (Pascagoula formation). Excluding the northwest corner of the basin area, the deposits encountered beneath the alluvium decrease progressively in age southward and are distributed along northeast-southwest trending bands. Reflecting the presence of a shallow tectonic basin in southeastern Arkansas, deposits of late Eocene age (Jackson Group) occur again in the northwestern part of the basin area north of the band of older Eocene (Claiborne Group) deposits.

12. Pleistocene-age terrace deposits, consisting primarily of fluviatile sands and gravels, characteristically overlie the Tertiary deposits in the uplands. They are seldom exposed at the surface east of the alluvial valley because of the blanketing effect of the overlying loess deposits; however, they are well exposed on Sicily Island and particularly in the uplands to the west where the loess is thinner or absent. The terraces represent the basal, coarser portions of relict floodplains that have been uplifted and maturely dissected. According to most geologists, the loess represents eolian (windblown) deposits derived from braided stream deposits in the alluvial valley.

13. The oldest Recent deposits filling the entrenched valley are included in the thick wedge of fluviatile substratum sands and gravels. This unit is by far the thickest and most continuous body of sediments of essentially one type that occurs in the basin or in the entire Mississippi Alluvial Valley. At occasional points above the deeper entrenchments, substratum deposits attain a thickness of 250 to 300 ft. The typical substratum sequence is fine sands grading downward into progressively coarser sands. The first gravels appear at depths of 75 to 100 ft and become more abundant and larger in size with increasing depth.

14. Sediments in the lower one-half to two-thirds of the substratum were deposited largely by ancient, shallow and swiftly flowing, braided courses of the combined Mississippi and Ohio Rivers carrying large volumes of coarse glacial debris. The upper one-third to one-half of the substratum consists of younger point bar sands and occasional gravels deposited by meandering courses of the Mississippi River and smaller rivers during approximately the last 5000 years.

15. The topstratum deposits in the Boeuf-Tensas Basin include those sediments which were laid down during approximately the past 5000 to 8000 years. Although they represent deposition by meandering streams as well as by braided streams, they are considerably finer grained than the substratum deposits and were deposited in seven major environments of deposition. Each environment of deposition is described and illustrated in fig. 3.

16. The oldest portions of the topstratum are the braided-relict alluvial fan surfaces of the Mississippi River and the Arkansas River which characterize the western half of the area lying between Black River and Catahoula Lake and Macon Ridge, respectively. In the case of Macon Ridge, three separate stages of braided stream deposition, representing a total period of perhaps 3000 years, can be recognized by differences in surface level.

17. By about 5000 years ago, the gradients of the Mississippi, Ohio, Arkansas, and smaller rivers had decreased to the extent that the streams changed from a braided to a meandering pattern in the basin area. The decrease in gradients was brought about by the postglacial rising sea level.

18. One of the earliest discernible meandering courses of the Mississippi River is marked by the present course of the Tensas River from a point northwest of Tallulah, Louisiana, to near the southern edge of the Shackleford Lake quadrangle (fig. 1). At the latter location, it was joined by the Ohio River; the combined streams then flowed southward in the area between the Black and Tensas Rivers and the present Mississippi River generally along the present route of Bayou Cocodrie. During successive stages representing perhaps as much as 1000 years, the combined Mississippi and Ohio Rivers meandered considerably but generally followed a course along the route of the present Mississippi River from Greenville, Mississippi, to near Tallulah, Louisiana, thence along the route of the Tensas and Black Rivers to the southern limit of the basin area. The present Mississippi River meander belt in the southern part of the basin was established about 1000 years ago following a diversion near Vicksburg.

19. Aside from the Mississippi River, the Ohio River, and the two streams combined, the only other significant meandering stream in the basin has been the Arkansas River. Meander belts both to the west and east of Macon Ridge alternately were occupied by the stream following its transition from a braided to a meandering pattern. Some of the meandering courses flowed through the gap between Sicily Island and the uplands to the west and, continuing southward, incised themselves into the older Mississippi River braided-relict alluvial fan lying between Black River and Catahoula Lake. Farther north in the basin, Bayou Macon, Boeuf River, Bayou Bartholomew, and the Ouachita River each now flow in abandoned courses of the Arkansas River.

Environments of Deposition

20. The Recent topstratum deposits in the Boeuf-Tensas Basin are subdivided into seven environments of deposition (fig. 3). Each environment represents a specific method of deposition of the constituent materials. The soils in each environment exhibit certain similarities in the distribution and volume of soil textures and in such physical characteristics as water content and cohesive strength.

21. The delineation of the environments of deposition, based on a careful study of aerial photographs and subsurface data, therefore becomes a key to the types of both surface and subsurface soils in an area. However, to state that a delineation of the environments of deposition is an infallible indication of the detailed subsurface conditions is a misrepresentation. This delineation is the first and most important step in an investigation and is an improvement over subsurface mapping methods in which soil types in borings some distance apart are connected by straight lines without regard to the significant soil discontinuities that may lie between the borings. Delineation of the various environments of deposition is a necessary step in an orderly method of developing the subsurface geologic setting and in planning a boring program to add further detail.

Explanation of Maps and Sections

22. The plates in this folio show the distribution of alluvial deposits in the Boeuf-Tensas Basin in plan and in profile. On each of the base maps (plates designated "a"), which are full-scale reproductions of the latest standard 1:62,500-scale topographic quadrangles, five of the seven environments of deposition of the topstratum are shown in color. The other two environments, the alluvial apron and the natural levee deposits, are shown as a dashed and a dotted overprint, respectively, so as not to mask the type of deposits lying beneath these two essentially surficial deposits. Heavy black dashed lines are used to show the locations of selected major swales in point bar areas that illustrate the trends of the meanders. A blue dotted pattern is used to portray large swalelike areas of various origins (e.g. crevasse scourings or "blue holes" and areas of slackwater deposition behind bars) where thick deposits of fine-grained materials occur. The elevations of the surfaces of the entrenched Tertiary deposits are shown by means of red contours. The borings used to contour the surfaces are shown as small red dots. No attempt has been made to map the loess or any of the Pleistocene or older deposits adjacent to the valley; they are designated simply as uplands.

23. Where boring information is sufficient, one or more cross sections have been prepared to accompany each map. Each plate containing cross sections bears the designation "b." Where information is sufficiently detailed, principally where closely spaced engineering borings have been made, the soil types are shown in color. Note that soil types are shown only to the depths of the detailed borings and not in the natural levee or alluvial apron environments where heterogeneous and highly lenticular soils occur.

24. The classification of soil types used in the cross sections is based on the system used by the Lower Mississippi Valley Division prior to 1950. This was unfortunately necessary because of the large number of borings used in the study that predate 1950. For comparison with more recent borings classified by the Unified Soil Classification System (USCS), and so that these borings could be used in the study, probable equivalents of the older system and the USCS were determined and are shown in the legend. It is emphasized, however, that the two systems do not equate precisely; for example, soils classified as lean clay (CL) according to the USCS may occasionally be included with the soil types shown in blue (clay sand, sandy clay, silt, sandy silt) as well as with those shown in green (clay, blue mud, silty clay, clay silt) in the older system.

Mapping Limitations

25. The maps and cross sections in this folio should be considered as being of a reconnaissance nature only. The aerial photo interpretation has been field checked to only a limited degree, and borings are available as substantiating data in only relatively few areas. Furthermore, the mapping technique allows for little quality control, i.e. features of doubtful origin and/or areal extent are portrayed in the same manner as are well-defined ones of unequivocal origin.

26. Also, it should be kept in mind that the accuracy of individual contacts, contours, and other designations is affected by the scale of the map, limitations in the source data (e.g. aerial photos), and progressive errors that may develop during the several stages of drafting and printing. In no case should an accuracy in plan of more than ± 200 ft be expected for the position of a contact, contour, or other designation.

SYSTEM	SERIES	GROUP	FORMATION OR SUBDIVISION	RANGE IN THICKNESS (FEET)	GENERALIZED SECTION	LITHOLOGY
QUATERNARY	RECENT*		TOPSTRATUM	0-150		See Fig. 3 for descriptions of seven subdivisions of topstratum.
			SUBSTRATUM	0-280		Massive, clean sands overlying sands and gravels. Deposited by both meandering and braided streams.
	Note: Recent deposits unconformably overlie all Pleistocene and Tertiary formations except the loess.					
	PLEISTOCENE		LOESS	20-90		Light tan, yellow-brown, or gray, massive clay silt and silty clay. Loess will stand in nearly vertical bluffs, is calcareous, and contains scattered fossil snail shells.
			UNDIFF. TERRACE DEPOSITS	10-150		Fine- to coarse-grained, cross-bedded sands with scattered small gravel usually overlying thinner, massive to rudely bedded gravel and sand mixtures. Colors are typically white, pink, red, yellow, and/or brown. Occasional thin layers of ferruginous clay may be present. Includes deposits sometimes designated as Natchez and Citronelle formations.
TERTIARY	MIOCENE		PASCAGOULA	0-200		Gray, bluish-gray, and greenish-gray clay and sandy clay with layers of light-gray to white claystone, fine sand, and sandstone. Clays are occasionally fossiliferous, and sometimes mottled with red and brown; both clays and sands infrequently contain lignitized wood. This formation is a probable equivalent of the Fleming formation of Louisiana.
			HATTIESBURG	0-450		Hard, dark gray to light gray clays mottled with red, yellow, and brown, blue and gray claystone layers, and thin bluish-green to green, fine-grained sandstone, cemented sand, and/or sand. Occasional lignitic clay zones may be present. This formation is a probable equivalent of the Fleming formation of Louisiana.
			CATAHOULA	0-350		Gray, light gray, buff, or white tuffaceous siltstones and sandstones and loose, fine- to medium-grained sands with thinner zones of brownish-gray or greenish-gray, plastic, lignitic clay. Formation not subdivided in Mississippi; several members recognized in Louisiana.
	OLIGOCENE	VICKSBURG	BYRAM	90-120		BUCATUNNA CLAY MEMBER (30-40 feet). Dark brown, lignitic, plastic clay of marine or estuarine origin with a few thin siltstone and claystone layers. MIDDLE MARL MEMBER (40-50 feet). Highly fossiliferous marine clay and sandy marl with zones of nodular or lenticular hard limestone. Also referred to as "Byram marl".
			MARIANNA	20		GLENDON LIMESTONE MEMBER (30-40 feet). Alternating strata of hard, sandy limestone and clayey, sandy marl. Individual limestone layers < 5 feet thick. MINT SPRING MARL MEMBER. Fossiliferous, sandy and clayey marl with occasional phosphatic and lignitic pebbles.
			FOREST HILL	0-150		Clayey, lignitic silts irregularly interbedded with fine-grained, cross-bedded sands. Discontinuous thin layers of clayey lignite and carbonaceous silty clay may occur. Forest Hill included in Eocene series by some workers.
	?					
	EOCENE	JACKSON	YAZOO	0-500		Dark gray, massive, plastic clay with widely scattered, irregular zones of silty clay. Formation is occasionally fossiliferous and contains a thin (< 1-foot-thick) bentonite bed near the top.
			MOODYS BRANCH	0-40		Fossiliferous sandy and clayey marl with occasional indurated layers and nodular zones.
		CLAIBORNE	COCKFIELD	200-400		Highly lenticular, alternating, thin beds or strata of gray to gray-brown clays and light gray silts or silty sands. Lignite fragments are scattered throughout the deposits and impure lignite beds up to 5 feet in thickness occur. Basal portion of formation contains less clay and more sand; occasional massive, cross-bedded silty sands are encountered.

* Most workers in the central Gulf Coast area and the Lower Mississippi Valley define the Recent as being that period following the last major glacial low stand of sea level. In these areas, this is a recognizable stratigraphic break dated at about 18,000 to 20,000 years ago. However, elsewhere in the U. S., the Recent is generally accepted as being that period following the dissipation of the last continental glacier and the return of sea level to its approximate present level, or about the last 5000 years. If this definition is accepted, most of the substratum deposits would be assigned to the Pleistocene series. In either case, however, the substratum probably contains some localized deposits remaining from earlier interglacial periods that would be of unquestionable Pleistocene age.

Modified from E. M. Cushing and others, *General Geology of the Mississippi Embayment*, U. S. Geological Survey Professional Paper 448-B, 1964; and W. H. Monroe, *Geology of the Jackson Area, Mississippi*, U. S. Geological Survey Bulletin 986, 1954.

Fig. 2. Stratigraphic column, Boeuf-Tensas Basin

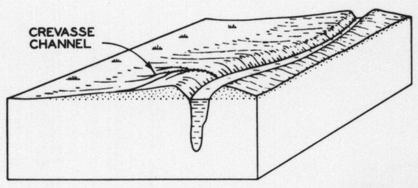
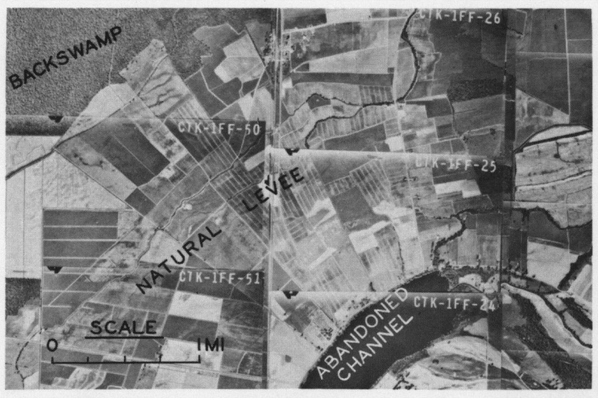
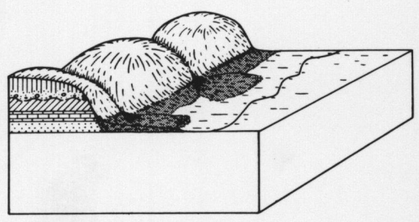
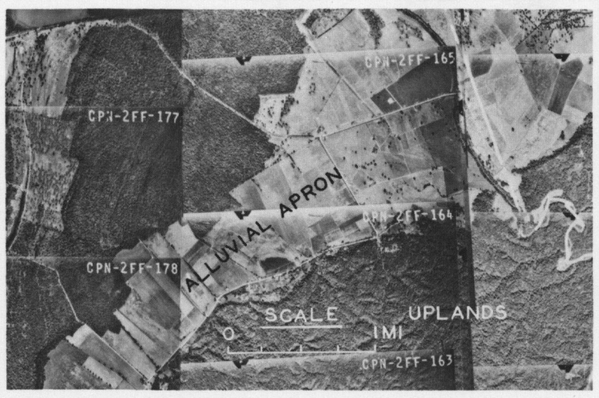
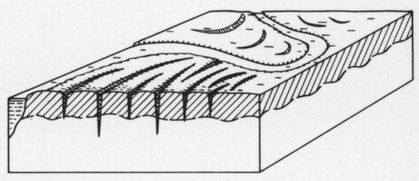
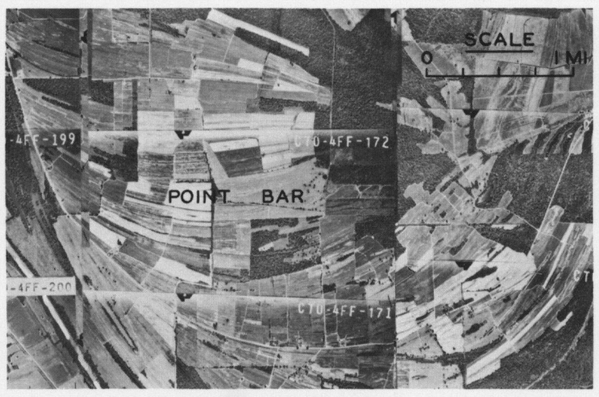
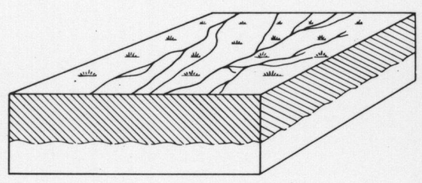
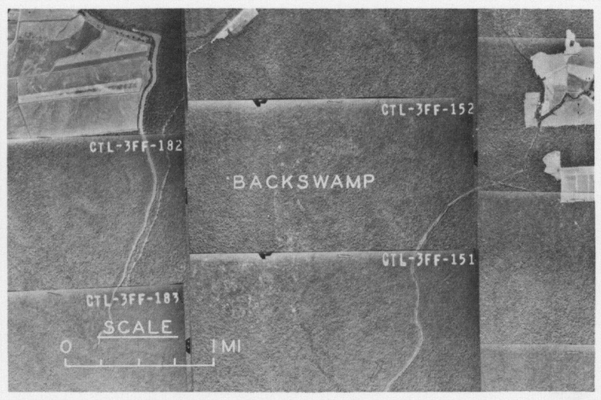
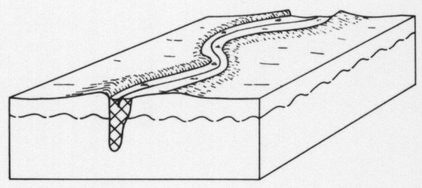
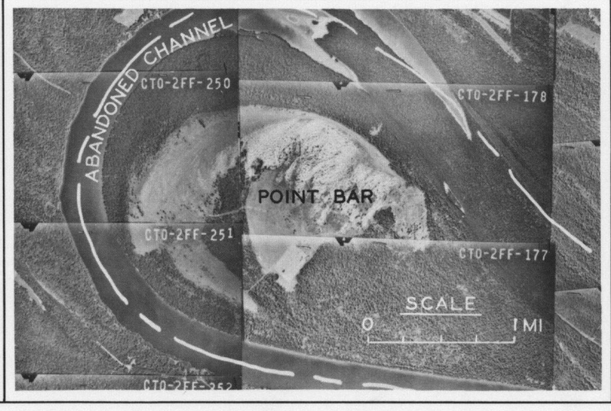
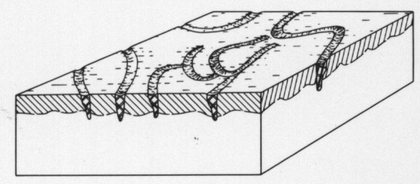
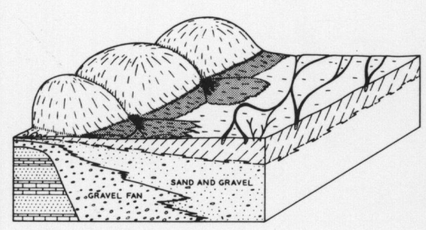
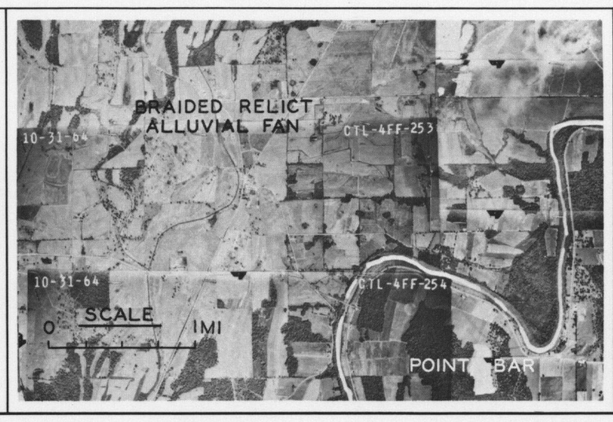
TYPE OF TOPSTRATUM DEPOSITS	DIAGRAMMATIC ILLUSTRATION	APPEARANCE ON AERIAL PHOTOGRAPHS	METHOD OF DEPOSITION	OCCURRENCE AND CHARACTERISTICS
NATURAL LEVEE			Natural levees are low ridges which flank both sides of streams that periodically overflow their banks. Since the coarsest and greatest quantities of sediment are deposited closest to the stream channels, the natural levees are highest and thickest in these areas and gradually thin away from the channels. In general, the greater the distance from the stream, the greater the percentage of the finer grained sediments. Minute drainage channels trending at right angles to the parent stream (down the backslope of the levees) are rather common; major crevasses are indicated when these channels are large and pronounced. Abandoned crevasse channels are often filled with sediments that are distinctly coarser than the remainder of the natural levee.	The largest and most widespread natural levees in the Boeuf-Tensas Basin occur along the present course and abandoned channels and courses of the Mississippi River. They attain crest heights of 10 to 15 ft above the adjacent backswamp areas, and may be 2 miles or more in width. Natural levees also occur along smaller streams in the area; however, they are appreciably narrower and steeper than those along the Mississippi. Typical natural levee deposits consist of stiff to very stiff, brown to grayish-brown silts, silty clays, and clays that exhibit moderate to high degrees of oxidation. Natural water contents of the deposits are typically low, and organic matter is seldom present except in the form of roots.
ALLUVIAL APRON			Alluvial aprons are combinations of alluvial and colluvial deposits which overlie the floodplain deposits along the valley walls and along the sides of upland remnants within the valley. Typically, symmetrical alluvial fans are present at the mouths of streams that drain the uplands. When these streams are rather closely spaced, the fans coalesce to form the alluvial aprons. When the streams are more widely spaced, the fans are separated, and the intervening portions of the aprons are composed mainly of sediments that have washed down from the uplands or that have moved downslope by soil creep (colluvial deposits).	Alluvial apron deposits occur intermittently along both the eastern and western valley walls and around Sicily Island. They are best developed near the mouths of the small streams that enter from the uplands and particularly where they overlie backswamp deposits and thus have not been affected by migration of the river. Alluvial apron widths of more than a mile are common, and elevations of 15 to 20 ft above the floodplain level occur near the apron crests. Reflecting the composition of the materials in the uplands (loess and terrace deposits primarily), the alluvial apron deposits consist of clayey silts, silts, and fine sands. Coarser sand and possibly even small quantities of gravel may be present near the mouths of the more active upland streams. Because they are well drained, they are oxidized and generally similar to natural levee deposits.
POINT BAR			Point bar deposits consist of sediments laid down on the insides of river bends as a result of meandering of the stream. Although the deposits extend to a depth equal to the deepest portion or thalweg of the parent stream, only the uppermost, fine-grained portion is included as part of the topstratum. Within the point bar topstratum, there are two types of deposits: silty and sandy, elongate bar deposits or "ridges" which are laid down during high stages on the stream, and silty and clayey deposits in arcuate depressions or "swales" which are laid down during falling river stages. Characteristically, the ridges and swales form an alternating series, the configuration of which conforms to the curvature of the migrating channel and indicates the direction and extent of meandering.	Point bar deposits are most widespread along the present course of the Mississippi River and along the abandoned courses of both the Mississippi and Arkansas Rivers. Because of successive occupations of certain meander belts by streams of different sizes, complex patterns of ridge-and-swale topography are common. Point bar topstratum deposits consist of tan to gray clays, clayey silts, silts, and fine sands in the ridges, and soft, gray clays and silty clays in the swales. Excluding the larger swales, which occasionally may be over 75 ft thick, the topstratum varies from 20 to 40 ft in thickness. Both water and organic contents are high in the swale deposits, whereas they are both commonly low in the ridge deposits.
BACKSWAMP			Backswamp deposits consist of fine-grained sediments laid down in broad, shallow basins during periods of stream flooding. The sediment-carrying floodwater may be ponded between the natural levee ridges on separate meander belts, or between natural levee ridges and the uplands or upland remnants within the alluvial valley. Backswamp areas typically have very low relief and a distinctive, complicated drainage pattern in which the channels alternately serve as tributaries and distributaries at different times of the annual flood cycle.	Backswamp deposits are widespread, particularly in the southern part of the Boeuf-Tensas Basin. These deposits are continuous over areas of over 100 square miles, and they attain thicknesses of 80 to 90 ft. Varying thicknesses of natural levee and/or alluvial apron deposits usually overlie the backswamp deposits, except near the centers of the basins in which the backswamp deposits occur. Soft to stiff, gray to dark gray-brown clays and silty clays are the typical backswamp deposits. Occasional thin layers of silt or sand may be found, and organic matter in the form of disseminated particles, peat layers, and large wood fragments is numerous. Average water contents of the deposits are moderately high but less than those of channel and swale fillings.
ABANDONED CHANNEL			Abandoned channels, or "clay plugs" as they are commonly called, are partially or wholly filled segments of stream channels formed when the stream shortens its course. Soon after formation, they are usually characterized by open water or oxbow lakes. Subsequently, they may become essentially filled and occasionally completely obscured by various meander belt deposits. The abandoned segment may represent an entire meander loop formed by the stream cutting directly across a narrow neck of two converging arms of a loop (a neck cutoff), or it may represent a portion of a loop formed when a stream occupies a large point bar swale during flood stage and abandons the outer portion of the loop (a chute cutoff).	Abandoned channels formed by meandering streams of all sizes are numerous in various portions of the basin. Mississippi River abandoned channels are usually 5 to 10 miles or more in length (following the loop), several thousand feet in width (channel width), and 100 ft or more in depth. The upper portions of the arms of the loops of neck cutoffs are normally filled with a short wedge of fine sand and silty sand. The soft, gray or blue-gray clays with high water contents that occur around the loop between the sand wedges comprise the "clay plug" portion of the abandoned channel. Homogeneous, soft, fat clays 90 to 100 ft thick have been encountered in Mississippi River clay plugs.
ABANDONED COURSE			Abandoned courses are lengthy segments of a river abandoned when the stream forms a new course across the floodplain. The abandoned course, varying from a few miles (but always more than one meander loop) up to hundreds of miles in length, gradually fills with sediment and is often occupied by a smaller or underfit stream. Indications are that the old course fills with a wedge of sand, thickest where the new course diverges from the old, and gradually thinning downstream. In many cases, the smaller stream meanders within the confines of the larger meander belt and destroys segments of the abandoned course. In other cases, the smaller stream delineates the extent of the abandoned course when there are no other indications of its presence.	Most of the surface expressions of Mississippi River abandoned courses have been destroyed by the meandering of smaller streams. The short, isolated segments that are recognizable are similar in size and shape to abandoned channels. Abandoned courses of smaller streams are numerous in the southern part of the basin. Data are insufficient to describe the sediments filling abandoned Mississippi River courses, other than to state that the topstratum appears to be quite thin. Abandoned courses of smaller streams are filled with clays and silty clays that are very similar in composition and thickness to those in clay plugs. The total silt content of abandoned course deposits appears to be slightly higher, however.
BRAIDED-RELICT ALLUVIAL FAN			Braided-relict alluvial fan deposits consist of the sediments that were laid down by rapidly shifting, aggrading streams during the earlier stages of valley alluviation. The braided stream deposits were formed both by shallow, anastomosing, ancestral streams of the Ohio and Mississippi Rivers and by smaller streams emerging from the uplands adjacent to the entrenched valley. In the subsurface, the alluvial fans are characterized by a cone of coarse-grained sediments, the apex of which marks the entrance of the stream into the valley. The sediments in the uppermost portion of the fans are somewhat finer grained, and are called the topstratum.	Braided-relict alluvial fan deposits are not widespread in the basin; they occur on Macon Ridge and in the southwestern part of the basin near Catahoula Lake. On the basis of only limited data, the deposits appear to consist of light gray to tan, well-graded mixtures of clays, silts, and sands. The fine-grained topstratum (clays and silts) is probably on the order of 10 to 30 ft thick. Both water and organic contents of the sediments probably are very low. The average grain size of the sediments probably increases toward the northern end of the basin.

Fig. 3. Nature and occurrence of Recent topstratum deposits, Bouef-Tensas Basin

FT. CHARTRES
LEVEE DISTRICT

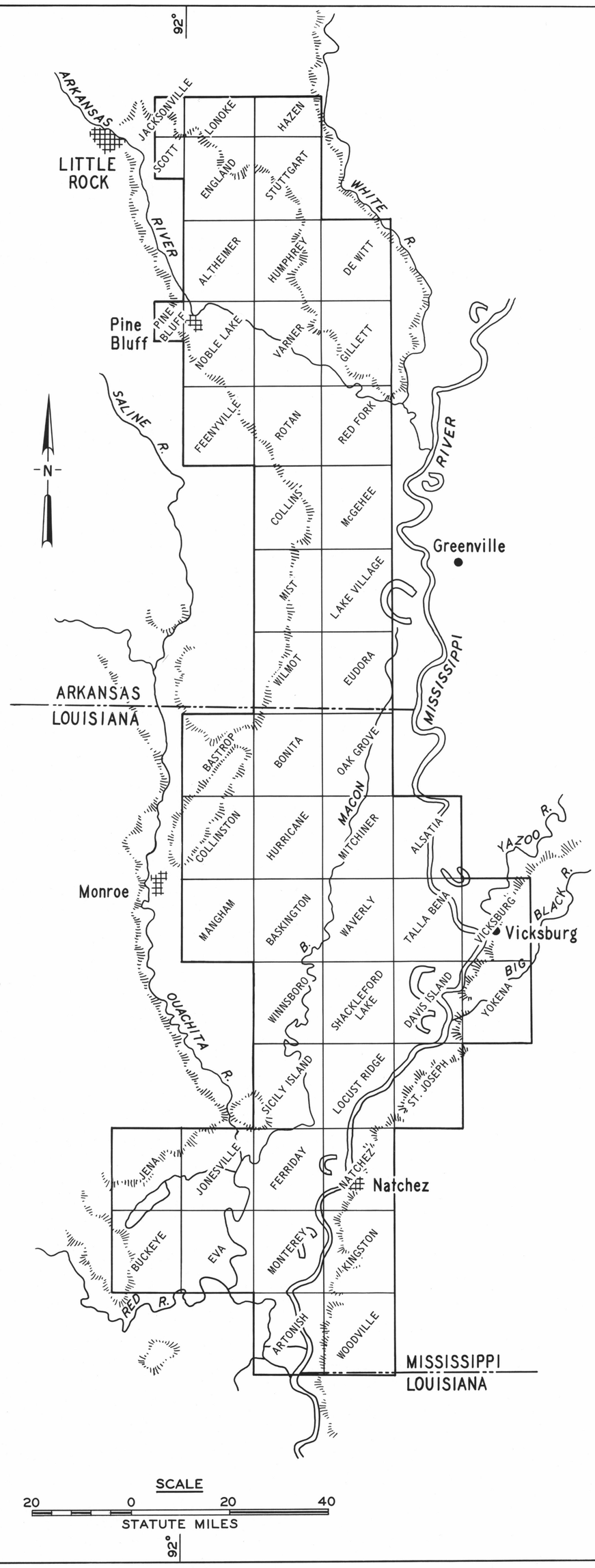
CHANGE IN LEVEE
DISTRICT

PRAIRIE DU ROCHER
LEVEE DISTRICT

A
B
B'
A'
W115
P1
W113
W106
W94
W95
C28
C27
C30
W171/C12
W239/C4
28/C5
C6
C7
C8
W 41
C9
W59
W55
C10
W189/C11
W71
C12
C13
C14
C16
C17
C18
C19
W168/C35
P84/C33
C32
FOR BORING C32 SEE
SEE QUAD SHEET FOR #4.

#3

BORINGS
PRAIRIE, DU ROCHER, EVANSVILLE, & ST. GENEVIEVE & MO-IL



List of Plates

Plate	Title
Alsatia (a) Alsatia (b)	Distribution of Alluvial Deposits, Alsatia, Miss.-La. Sections A-A' and B-B', Alsatia, Miss.-La.
Altheimer (a) Altheimer (b)	Distribution of Alluvial Deposits, Altheimer, Ark. Sections A-A', B-B', and C-C', Altheimer, Ark.
Artonish (a) Artonish (b)	Distribution of Alluvial Deposits, Artonish, Miss.-La. Sections A-A' and B-B', Artonish, Miss.-La.
Baskinton (a) Baskinton (b)	Distribution of Alluvial Deposits, Baskinton, La. Sections A-A' and B-B', Baskinton, La.
Bastrop (a) Bastrop (b)	Distribution of Alluvial Deposits, Bastrop, La. Sections A-A' and B-B', Bastrop, La.
Bonita (a) Bonita (b)	Distribution of Alluvial Deposits, Bonita, La. Sections A-A', B-B', and C-C', Bonita, La..
Buckeye (a) Buckeye (b)	Distribution of Alluvial Deposits, Buckeye, La Sections A-A' and B-B', Buckeye, La.
Collins (a) Collins (b)	Distribution of Alluvial Deposits, Collins, Ark. Sections A-A' and B-B', Collins, Ark.
Collinston (a) Collinston (b)	Distribution of Alluvial Deposits, Collinston, La. Sections A-A' and B-B', Collinston, La.
Davis Island (a) Davis Island (b)	Distribution of Alluvial Deposits, Davis Island, Miss.-La. Sections A-A' and B-B', Davis Island, Miss.-La.
De Witt (a) De Witt (b)	Distribution of Alluvial Deposits, De Witt, Ark. Sections A-A' and B-B', De Witt, Ark.
England (a) England (b)	Distribution of Alluvial Deposits, England, Ark. Sections A-A' and B-B', England, Ark.
Eudora (a) Eudora (b)	Distribution of Alluvial Deposits, Eudora, Ark. Sections A-A' and B-B', Eudora, Ark.
Eva (a) Eva (b)	Distribution of Alluvial Deposits, Eva, La. Sections A-A' and B-B', Eva, La.
Feenyville (a)	Distribution of Alluvial Deposits, Feenyville, Ark.
Ferriday (a) Ferriday (b)	Distribution of Alluvial Deposits, Ferriday, La.-Miss. Sections A-A' and B-B', Ferriday, La.-Miss.
Gillett (a) Gillett (b)	Distribution of Alluvial Deposits, Gillett, Ark. Sections A-A', B-B', and C-C', Gillett, Ark.
Hazen (a) Hazen (b)	Distribution of Alluvial Deposits, Hazen, Ark. Sections A-A' and B-B', Hazen, Ark.
Humphrey (a) Humphrey (b)	Distribution of Alluvial Deposits, Humphrey, Ark. Sections A-A' and B-B', Humphrey, Ark.
Hurricane (a) Hurricane (b)	Distribution of Alluvial Deposits, Hurricane, Ark. Sections A-A' and B-B', Hurricane, Ark.
Jacksonville-Scott (a) Jacksonville-Scott (b)	Distribution of Alluvial Deposits, Jacksonville-Scott, Ark. Sections A-A', B-B', C-C', and D-D', Jacksonville-Scott, Ark.
Jena (a) Jena (b)	Distribution of Alluvial Deposits, Jena, La. Section A-A', Jena, La.
Jonesville (a) Jonesville (b)	Distribution of Alluvial Deposits, Jonesville, La. Sections A-A' and B-B', Jonesville, La.
Kingston (a)	Distribution of Alluvial Deposits, Kingston, Miss.-La.
Lake Village (a) Lake Village (b)	Distribution of Alluvial Deposits, Lake Village, Ark. Sections A-A' and B-B', Lake Village, Ark.
Locust Ridge (a) Locust Ridge (b)	Distribution of Alluvial Deposits, Locust Ridge, La.-Miss. Section A-A', Locust Ridge, La.-Miss.
Lonoke (a) Lonoke (b)	Distribution of Alluvial Deposits, Lonoke, Ark. Sections A-A' and B-B', Lonoke, Ark.
Mangham (a) Mangham (b)	Distribution of Alluvial Deposits, Mangham, La. Sections A-A' and B-B', Mangham, La.
McGehee (a) McGehee (b)	Distribution of Alluvial Deposits, McGehee, Ark. Sections A-A' and B-B', McGehee, Ark.
Mist (a) Mist (b)	Distribution of Alluvial Deposits, Mist, Ark. Section A-A', Mist, Ark.
Mitchiner (a) Mitchiner (b)	Distribution of Alluvial Deposits, Mitchiner, La. Sections A-A' and B-B', Mitchiner, La.
Monterey (a) Monterey (b)	Distribution of Alluvial Deposits, Monterey, La.-Miss. Sections A-A' and B-B', Monterey, La.-Miss.
Natchez (a) Natchez (b)	Distribution of Alluvial Deposits, Natchez, Miss.-La. Sections A-A' and B-B', Natchez, Miss.-La.
Noble Lake (a) Noble Lake (b)	Distribution of Alluvial Deposits, Noble Lake, Ark. Sections A-A' and B-B', Noble Lake, Ark.
Oak Grove (a) Oak Grove (b)	Distribution of Alluvial Deposits, Oak Grove, La. Sections A-A' and B-B', Oak Grove, La.
Pine Bluff	Distribution of Alluvial Deposits and Section A-A', Pine Bluff, Ark.
Red Fork (a) Red Fork (b)	Distribution of Alluvial Deposits, Red Fork, Ark. Sections A-A' and B-B', Red Fork, Ark.
Rotan (a) Rotan (b)	Distribution of Alluvial Deposits, Rotan, Ark. Sections A-A' and B-B', Rotan, Ark.
St. Joseph (a) St. Joseph (b)	Distribution of Alluvial Deposits, St. Joseph, Miss.-La. Section A-A', St. Joseph, Miss.-La.
Shackleford Lake (a) Shackleford Lake (b)	Distribution of Alluvial Deposits, Shackleford Lake, La. Sections A-A' and B-B', Shackleford Lake, La.
Sicily Island (a) Sicily Island (b)	Distribution of Alluvial Deposits, Sicily Island, La. Sections A-A' and B-B', Sicily Island, La.
Stuttgart (a) Stuttgart (b)	Distribution of Alluvial Deposits, Stuttgart, Ark. Sections A-A' and B-B', Stuttgart, Ark.
Talla Bena (a) Talla Bena (b)	Distribution of Alluvial Deposits, Talla Bena, La.-Miss. Sections A-A' and B-B', Talla Bena, La.-Miss.
Varner (a) Varner (b)	Distribution of Alluvial Deposits, Varner, Ark. Sections A-A' and B-B', Varner, Ark.
Vicksburg (a) Vicksburg (b)	Distribution of Alluvial Deposits, Vicksburg, Miss.-La. Sections A-A' and B-B', Vicksburg, Miss.-La.
Waverly (a) Waverly (b)	Distribution of Alluvial Deposits, Waverly, La. Section A-A', Waverly, La.
Wilmot (a) Wilmot (b)	Distribution of Alluvial Deposits, Wilmot, Ark.-La. Sections A-A' and B-B', Wilmot, Ark.-La.
Winnsboro (a) Winnsboro (b)	Distribution of Alluvial Deposits, Winnsboro, La. Sections A-A' and B-B', Winnsboro, La.
Woodville (a)	Distribution of Alluvial Deposits, Woodville, Miss.
Yokena (a) Yokena (b)	Distribution of Alluvial Deposits, Yokena, Miss.-La. Sections A-A' and B-B', Yokena, Miss.-La.

Fig. 1. Quadrangle coverage of the Boeuf Tensas Basin